



# **Chief Information Officer Functional Leadership Plan**

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## **Functional Leadership Plan Office of the Chief Information Officer**

### **I. Purpose**

This document sets forth the NASA Office of the Chief Information Officer Functional Leadership Plan.

The Chief Information Officer (CIO), located in the Office of the Administrator, is the principal advisor to the Administrator and other senior officials on matters pertaining to Information Technology (IT). The Office of the CIO establishes policies for planning, acquiring, managing, and using IT to accomplish NASA's missions and programs efficiently, effectively, safely, and securely.

### **II. Mission**

NASA seeks to make measurable improvements in mission performance, cost of program/project development and operations, and service delivery to the public through the strategic application of IT. The Office of the Chief Information Officer supports this activity by implementing IT procedures and guidelines that are aligned with NASA's Strategic Plan and integrated with the process defined in the NASA Strategic Management Handbook.

IT is addressed in the NASA Strategic Plan as part of the crosscutting process entitled "Manage Strategically." The objective for IT stated in the current NASA Strategic Plan is:

"To ensure information technology provides an open and secure exchange of information, is consistent with Agency technical architectures and standards, demonstrates a projected return on investment, reduces risk, and directly contributes to mission success."

### **III. CIO Responsibilities**

The Information Technology Management Reform Act of 1996, also known as the Clinger-Cohen Act, outlined the processes that federal agencies should use to acquire IT resources and to manage IT investments. The Clinger-Cohen Act also required federal agencies to establish the position of Chief Information Officer (CIO.) The NASA CIO, as the Agency's change agent for the Clinger-Cohen Act, must provide vision and leadership to ensure that:

- ✧ the Agency is making the right investments in IT, and
- ✧ IT investments are managed in such a way as to ensure the Agency achieves an acceptable return on its investment.

In addition to the requirements of the Clinger-Cohen Act, the CIO's activities are driven by a number of other legislative and regulatory requirements, including the Paperwork Reduction Act, the Government Performance and Results Act (GPRA), and the Freedom of Information Act (FOIA). Most importantly, however, the CIO must take into account the specific needs of NASA and its scientific, engineering, and administrative activities in the IT planning, acquisition, and management process.

The CIO has the following functional responsibilities:

- ✧ Leads the development of Agency-level IT policies, plans, standards, capabilities, and architectures;
- ✧ Assesses and improves existing IT initiatives;
- ✧ Reviews, evaluates, and provides recommendations on major IT investments to the Capital Investment Council;
- ✧ Develops IT performance metrics;
- ✧ Evaluates Agency progress and performance in achieving IT-related objectives;
- ✧ Implements a sound, integrated, and secure IT architecture;
- ✧ Assures that NASA's workforce has the appropriate IT skills and knowledge to meet Agency objectives;
- ✧ Reports for the Agency to the Office of Management and Budget (OMB) and Congress on the impact of IT investments on programs;
- ✧ Provides leadership and oversight for other initiatives and programs related to IT and information services.
- ✧ In cooperation with the Critical Infrastructure Assurance Officer (CIAO), coordinates the efforts necessary to ensure the protection of the Agency's cyber critical infrastructure assets.

The NASA CIO is supported in these activities by an organizational framework that is integrated with the way the Agency implements its programs and projects. The IT Investment Council, comprised of senior management representing the Strategic Enterprises and key Agency functions, supports the CIO in establishing Agency-level IT policies, plans, and standards, and serves as a forum for addressing key policy and funding decisions for Agency IT resources. The CIO Board, composed of CIOs from the Strategic Enterprises and Centers, ensures the effective and efficient application of IT to support Agency missions. The IT Security Council, co-chaired by the Office of Management Systems, coordinates with the CIO on IT security matters including policy, standards, and resource issues. More detailed information on the roles and responsibilities related to the NASA CIO organizational framework may be found in NPG 2800.

## IV. Functional Responsibilities

The NASA Office of the Chief Information Officer's functional responsibilities are aligned under four main focus areas. The NASA Office of the CIO provides leadership and strategic direction for the Agency's IT planning and implementation processes in these areas. The focus areas are:

1. Safety and security
2. Cost-effective common infrastructure and services
3. Innovative technology and practices
4. Emerging IT areas

### Focus Area 1: Safety and Security

We are committed to providing an exemplary IT security posture to protect the safety and integrity of NASA's missions, programs, and projects, as well as the safety of our astronauts and pilots, the NASA and contractor workforce, and the national resources under our charge.

### Initiative: IT Security

#### Goal:

Establish the optimal Agency security posture on issues related to IT security, and ensure that NASA's mission critical aerospace assets and systems are secure.

#### Objectives:

- ✧ Achieve a trained workforce of users, managers, system administrators, and network administrators; (Government Performance and Results Act metric)
- ✧ Reduce system and application vulnerabilities; (GPRA metric)
- ✧ Improve intrusion monitoring, reporting, and response;
- ✧ Improve mechanisms for user authentication and data protection;
- ✧ Improve adherence to Agency IT security policy.

#### Approach:

The Office of the CIO coordinates with the Office of Management Systems to create and implement a comprehensive Agencywide IT security plan. The IT security plan addresses:

- ✧ Policies and procedures;
- ✧ Incident response and reporting;
- ✧ Education and training;
- ✧ Auditing and monitoring;
- ✧ Risk assessments;
- ✧ Penetration testing;
- ✧ Security plans;
- ✧ Technologies. (e.g., Public Key Infrastructure, Virtual Private Networks, Tokens/Smart Cards, etc.)

**Metrics:**

- ✧ Meet desired percentages of employees trained on security topics, including security awareness, system administration, and project management (e.g., 80 percent of employees trained on awareness by the end of FY00);
- ✧ Reduction in ratio of number of computer system security vulnerabilities to number of computer systems;
- ✧ Ensure that 100 percent of “special management attention” systems have completed risk assessments and/or IT security plans;
- ✧ Ensure 100 percent deployment of Public Key Infrastructure.

**Initiative: Software Management**

**Goal:**

Establish NASA engineering and management processes that enable safe and quality software.

**Objectives:**

- ✧ Improve the delivery of error tolerant, reliable, and reusable software that is on schedule and within cost;
- ✧ Define and implement metrics based software plan;
- ✧ Implement software engineering processes at all NASA Centers that are certified to Level 3 on the Capability Maturity Model (CMM);
- ✧ Develop a knowledge base of proven software engineering practices;
- ✧ Conduct and transfer fundamental software research that addresses:
  - High reliability and error tolerance;
  - Productivity increases;
  - Reusability of software and process;
  - Increased automation;
  - Emerging paradigms.

## **Approach:**

The Office of the CIO supports the Software Management initiative led by the Chief Engineer with additional participation by the Office of Safety and Mission Assurance. As part of the approach, a plan that addresses the following four areas of recommendations has been developed:

- ✧ Process improvement;
- ✧ Verification and validation;
- ✧ Software research;
- ✧ Software metrics.

## **Metrics:**

A critical element of the initiative to improve software management is the implementation of key metrics to evaluate software quality. Examples of metrics that are being evaluated include the following:

- ✧ Cost (planned vs. actual);
- ✧ Schedule (planned vs. actual);
- ✧ Workforce (planned vs. actual);
- ✧ Requirements (percent change since baseline);
- ✧ Development(planned vs. actual);
- ✧ Testing (number of open/closed Discrepancy Reports).

### **Focus Area 2: Cost Effective Common Infrastructure and Services**

We strive to provide common infrastructure and services to avoid infrastructure duplication, maximize common service efficiencies, and promote interoperability. Our strategies in doing this are enabling, effective, efficient, and consistent with the Agencywide technical architecture.

## **Initiative: Architecture & Standards**

### **Goal:**

Deliver an Agencywide IT environment that is secure, yet open, reliable, and interoperable.

### **Objectives:**

- ✧ Leverage technologies and practices to meet NASA challenges and goals;

- ✧ Provide a basis for value-added IT investment decision making and prioritization;
- ✧ Promote effective transfer of innovative technologies.

**Approach:**

- ✧ Principal Centers, designated by the Chief Information Officer to provide technical expertise on IT issues, propose architecture and standards to meet Agency requirements;
- ✧ Federated approach to approve and execute architecture and standards.

**Metrics:**

Metrics for the Architecture and Standards initiative are currently under development.

**Initiative: Agencywide Services and Solutions**

**Goal:**

Improve cost effectiveness and operating efficiency of Agency IT solutions and services.

**Objectives:**

- ✧ Implement management controls and performance measures to ensure appropriate administration of common IT and service elements;
- ✧ Ensure compliance with policy and regulatory requirements related to the provision of IT or information services.

**Approach:**

For these Agencywide services and solutions, responsibility for the program implementation is delegated to a Lead Center or Expert Center via a Memorandum of Understanding. The Office of the Chief Information Officer utilizes an oversight and review process to ensure that the activity adheres to quarterly performance metrics. Summaries of key Agencywide initiatives and services follow.

*Wide Area Networks*

The NASA Integrated Services Network (NISN) is NASA's wide area telecommunications network/service and is managed by the Space



Operations Management Office. The mission of the NISN is to provide cost-effective wide area network telecommunications services for transmission of data, video and voice for all NASA Enterprises, Programs and Centers, utilizing commercial resources wherever possible.

#### *Consolidated Mainframes*

The NASA Automated Data Processing (ADP) Consolidation Center (NACC) maintains and operates mainframe systems that support administrative processing requirements for the NASA Centers. The processes and procedures governing the NACC are structured to ensure maximum reliability, availability, and serviceability to the user community.

#### *Desktop*

The Outsourcing Desktop Initiative for NASA (ODIN) program is an outsourced arrangement that delivers comprehensive desktop computer, server, and intra-center communications services to NASA employees and contractors.

#### *Scientific and Technical Information*

The Scientific and Technical Information (STI) Program supports the Agency's missions to communicate scientific knowledge and understanding and transfer NASA's research and development information to the aerospace and academic communities.

#### *Records Management*

NASA's Records Management program ensures that the Agency's current records are available for use, significant records are preserved for our nation's history, and all other records are disposed of properly and legally.

#### *High End Computing*

NASA's High End Computing program examines how to best provide for the high-end computing needs of its engineering and science missions, programs, and projects.

#### *Integrated Financial Management Program*

The Integrated Financial Management Program (IFMP), managed by the NASA Office of the Chief Financial Officer, will provide NASA with a modern, leading edge business system that will promote the standardization and integration of business processes and systems across the Agency.

### *Printing Management*

The mission of NASA's Printing Management program is to maintain effective and efficient printing, duplicating, and copying management in support of NASA projects, programs, and overall management activities.

### *Forms and Mail Management*

The NASA Forms and Mail Management program provides Agencywide administration of the forms and mail management processes, recommends and develops policy, and implements guidance and procedures related to forms and mail management.

### *Information Collection Budget*

The Information Collection Budget (ICB) is the vehicle through which the Office of Management and Budget, in consultation with the Agency, sets "annual Agency goals to reduce information collection burdens imposed on the public." NASA's ICB summarizes agency accomplishments in the prior fiscal year and describes Agency goals for the following year.

### **Metrics:**

Specific metrics vary according to the initiative, and some of the initiatives have metrics currently under development. However, there are two common metrics used to assess all Agencywide services and solutions that are in operational status:

- ✧ Cost of service or solution;
- ✧ Customer satisfaction measurements.

### **Focus Area 3: Innovative Technology and Practices**

We will leverage innovative technology and practices to meet NASA challenges and revolutionize the way the Agency does business.

### **Initiative: Knowledge Management (KM)**

#### **Goal:**

Enhance corporate capability to manage information and communicate knowledge.

### **Objectives:**

- ✧ Benchmark the state of the art in knowledge management (KM);
- ✧ Identify NASA's current implementation of KM processes, tools, capabilities, structures, and resources;
- ✧ Define opportunities for applying KM for near-term challenges;
- ✧ Define a strategic plan for meeting long-term Agencywide KM requirements.

### **Approach:**

The KM initiative is led by an Agencywide, multi-disciplinary team, which is chartered by the Office of the Chief Information Officer. The team will:

- ✧ Formulate requirements, opportunities, and strategies related to KM at NASA;
- ✧ Use pilot activities to demonstrate the capabilities and value of KM technologies;
- ✧ Work toward the development of a federated Knowledge Architecture.

### **Metrics:**

- ✧ Measure percentages of employees trained, mainstreamed services provided (e.g., document management systems, authoring tools, expert directories), and strategic tools used;
- ✧ Demonstrate ownership, sharing and reuse of information; measure output of incentives and rewards for knowledge use;
- ✧ Increase number of knowledge access methods, building blocks, standards, and service bases used in knowledge architecture;
- ✧ Show increase in amount of knowledge resources, repositories, content, context, and directories.

### **Initiative: IT Workforce Challenge**

#### **Goal:**

Ensure that the NASA workforce has the necessary IT knowledge and skills.

#### **Objectives:**

- ✧ Benchmark the state of NASA's workforce with respect to IT;
- ✧ Develop mechanisms for improving the IT skills of NASA employees;
- ✧ Develop an IT career development model along the lines of NASA's Chief Financial Officer model;

- ✧ Improve the Agency's retention and recruitment of IT professionals where problems exist.

### **Approach:**

The IT Workforce Challenge initiative is led by an Agencywide, collaborative team, chartered by the Office of the Chief Information Officer. The team will:

- ✧ Assess the current state of NASA's workforce with respect to IT issues;
- ✧ Define requirements, opportunities, best practices, and strategies for IT workforce management;
- ✧ Ensure the creation of an IT Program Operating Plan focus area to support new hiring authority allowances.

### **Metrics:**

- ✧ Ensure appropriate levels of training in IT security for general employee workforce, system administrators, and project managers.
- ✧ Measure the effectiveness of NASA's participation in the Office of Personnel Management's IT Professional Pilot.
- ✧ Measure the effectiveness of Web-based IT training pilots.

## **Initiative: Information Technology (IT) Research and Development**

### **Goal:**

Optimize the insertion of innovative and proven technologies and capabilities into the NASA infrastructure.

### **Approach:**

- ✧ The IT Research and Development initiative uses an architecture-focused, collaborative approach that builds on previous investments, current infrastructures, and new technologies. This approach involves collaboration with NASA's research and development programs to facilitate the insertion of proven capabilities into the operational infrastructure. Pilot activities highlighting promising technologies (e.g., nanotechnology, intelligent systems, and biotechnology) and industry solutions will be utilized when possible.

### **Metrics:**

Metrics for the IT Research and Development initiative are currently under development.

#### **Focus Area 4: Emerging IT Areas**

We will keep abreast of current developments in information technology and, when appropriate, apply new procedures and tools to improve NASA's key business processes.

#### **Initiative: e-NASA**

##### **Goal:**

Promote end-to-end, electronic service delivery and business processes for NASA's customers, partners, and employees.

##### **Objectives:**

- ✧ Examine industry and government best practices in electronic commerce and electronic government;
- ✧ Enable use of electronic services to assist in workflow, communication, and learning processes for NASA employees, business partners, and customers.

##### **Approach:**

The Office of the Chief Information Officer, in collaboration with the Office of Procurement, will lead the establishment of an e-NASA initiative to look at the application of electronic commerce principles and processes to the Agency. The team will:

- ✧ Assess the application of industry proven electronic business initiatives which have demonstrated return on investment (ROI) for their organizations;
- ✧ Establish flexible priorities for moving to the digital arena, and weigh the benefits of near-term versus long-term deployment of e-government for NASA;
- ✧ Measure success by demonstrating productivity enhancements and overall value added as a result of the e-NASA initiative.

**Metrics:**

Metrics for this initiative are currently in the definition stage, and will be refined based on the analysis of the e-NASA team. Examples of possible “gold standard” performance goals include 100 percent:

- ✧ Use of e-purchase cards Agencywide;
- ✧ Use of e-travel services;
- ✧ Use of e-grants;
- ✧ Availability of e-catalogs.